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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,874	06/20/2001	Donald James Lewis	200-1281(FGT 339)	1549
22844	7590	06/10/2004	EXAMINER	
FORD GLOBAL TECHNOLOGIES, LLC. SUITE 600 - PARKLANE TOWERS EAST ONE PARKLANE BLVD. DEARBORN, MI 48126			NGUYEN, TU MINH	
			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 06/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/681,874

Applicant(s)

LEWIS ET AL.

Examiner

Tu M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 8-12 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 071001, 022403, 032403.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted element is: "a comparison between the estimate of the actual amount of oxidants stored in the catalyst and an estimate of an available oxidant storage capacity".

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 6, 7, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Bush et al. (U.S. Patent 5,842,340).

Re claims 6 and 13, as shown in Figures 1 and 5, Bush et al. disclose a method and a system for adjusting an engine air-fuel ratio in an internal combustion engine (16) coupled to an exhaust system having a catalyst (34), the method comprising:

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- estimating an actual amount of oxidants stored in the catalyst (see Abstract and step 132 in Figure 5);
- comparing the actual oxidant amount to a target amount of stored oxidants (see Abstract and step 120 or 138);
- adjusting an amount of fuel provided to the engine based on the comparison (see Abstract); and
- adjusting an oxidant storage capacity of the catalyst based on the estimate of the actual amount of oxidants stored in the catalyst (see at least step 119 in Figure 5 and expressions (12) and (14) in column 7).

Re claim 7, in the method of Bush, the step of adjusting an oxidant storage capacity of the catalyst further comprises the step of:

- estimating an available oxidant storage capacity (OSC); and
- comparing the estimate of the actual amount of oxidants stored in the catalyst to the estimated available oxidant storage capacity (step 140).

3. Claims 6 and 13 are further rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kitagawa et al. (U.S. Patent 5,678,402).

As shown in Figures 1, 2, 14, and 15, Kitagawa et al. disclose a method and a system for adjusting an engine air-fuel ratio in an internal combustion engine (1) coupled to an exhaust system having a catalyst (14), the method comprising all of the features and limitations as claimed.

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Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. (U.S. Patent 5,678,402).

Re claim 1, as illustrated in Figures 1, 2, 14, and 15, Kitagawa et al. disclose an internal combustion engine (1) coupled to an exhaust system having a catalyst (14) and a method of adjusting an oxidant storage capacity of the catalyst, the method comprising:

- estimating a current amount (O2STR) of oxidants stored in the catalyst;
- estimating an amount (O2MAX) of oxidant storage available in the catalyst;
- comparing the estimated amount of oxidants stored in the catalyst to the estimated amount of oxidant storage available (Processing 7) (as shown in Figure 16A, a current amount O2STR is maintained within a lower limit (O2STRL) and an upper limit (O2STRH));
- adjusting an engine operating parameter (air-fuel ratio) in response to the comparison to secure a maximum purification rate of the catalyst (Processing 8-11).

Kitagawa et al., however, fail to specifically disclose that the engine operating parameter is adjusted to affect a temperature of the catalyst.

As shown in Figure 15 and indicated on lines 12-40 of column 21, Kitagawa et al. disclose that the purification rate of the catalyst is varied with the catalyst temperature; and that

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a maximum purification rate is achieved when a decreased amount of oxygen storage amount on a richer side of air-fuel ratio or an increased amount of oxygen storage amount on a leaner side of air-fuel ratio is required to be equal to O2MAX (lines 47-58 of column 24). Thus, it is obvious to those with ordinary skill in the art that Kitagawa et al. adjust an engine operating parameter to affect a temperature of the catalyst.

6. Claims 2, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. as applied to claim 1 above, in view of official notice.

Re claim 2, the method of Kitagawa et al. discloses the invention as cited above, however, fails to disclose that the engine operating parameter is indicative of engine spark.

Official notice is taken that providing an ignition or spark timing to combust an air-fuel mixture in the engine of Kitagawa et al. is old and well known in the art. Such an arrangement has the clear and obvious benefit of providing a stable combustion with minimum torque fluctuation. Accordingly, it would have been obvious to one with ordinary skill in the art at the time of the invention was made, to have incorporated the claimed limitation into the invention disclosed by Kitagawa et al. so as to provide for stable combustion with minimum torque fluctuation.

Re claim 4, the method of Kitagawa et al. further comprises the step of adjusting engine air mass in response to the adjusted parameter indicative of engine spark.

Re claim 5, in the method of Kitagawa et al., the engine air mass is adjusted based on a parameter indicative of a minimum spark required for best torque.

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7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. in view of official notice as applied to claim 2 above, and further in view of Cullen et al. (U.S. Patent 5,956,941).

The method of Kitagawa et al. discloses the invention as cited above, however, fails to disclose that the parameter indicative of engine spark is adjusted based on a temperature of an exhaust flange.

As shown in Figures 1-2, Cullen et al. teach that it is conventional in the art to estimate a catalyst temperature without using a catalyst temperature sensor by using a thermal model. In this model, an exhaust flange temperature is computed based on known engine parameters such as air-fuel ratio, air mass, etc. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Cullen et al. in the method of Kitagawa et al., since the use thereof would have reduced the complexity of the exhaust system and saved cost by not utilizing a catalyst temperature sensor.

Allowable Subject Matter

8. Claims 8-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior Art

9. The IDS (PTO-1449) filed on July 10, 2001, February 24, 2003, and March 24, 2003 have been considered. An initialized copy of each is attached hereto.

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of five patent: Blischke et al. (U.S. Patent 5,335,538), Nasu (U.S. Patent 5,475,975), Tayama et al. (U.S. Patent 6,289,673), Oguma et al. (U.S. Patent 6,494,037), and Kamoto et al. (U.S. 6,546,719) further disclose a state of the art.

Communication

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (703) 308-2833.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (703) 308-2623. The fax phone number for this group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1148.

Tu M. Nguyen

TMN

Tu M. Nguyen

June 1, 2004

Patent Examiner

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